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ORIGINAL PAPER

Religious Support Moderates the Long Reach of Adverse Childhood Events on Physical Health in Middle to Late Adulthood

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Abstract

Adverse childhood experiences are associated with impaired physical health in adulthood. Using data from the Midlife in the United States survey ($N = 4041$), this study examined whether four dimensions of religiosity moderated the long-term detrimental effects of early adversity on three distinct aspects of adult physical health (self-rated health, functional limitations, and shortness of breath). Regression analyses showed that religious support buffered the effect of childhood adversity on physical health, but religious identification, private religious practice, or religious service attendance did not. Results imply that interventions aimed at increasing religious support can be effective decades after the adverse experiences took place.

Keywords Adverse childhood experiences · Physical health · Religious support · Religion · Life-span development

Childhood experiences can have long-reaching effects on later health. Exposure to abuse, neglect, or other forms of household dysfunction has been shown to predict that a variety of health problems decades later (Felitti et al. 1998; Hughes et al. 2017). Multiple mediating pathways have been proposed to explain this relationship; however, far less research has explored possible variables that might mitigate the long-term effects of exposure to childhood adversity. Religious involvement has strong links with physical health, and from a life-span perspective, the context that religious involvement offers could plausibly provide resources that buffer the effects of hardship experienced early in life. Hence, this study investigated the moderating effect of four aspects of religiosity on the relationship between childhood adversity and adult health.

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Overview of Childhood Adversity and Health

The original Adverse Child Experiences (ACE; Felitti et al. 1998) study explored the relationship between retrospective reports of exposure to a range of adverse child experiences and adult health. It found that the more adverse exposures that people reported, including physical, emotional, or sexual abuse, and various forms of household dysfunction such as substance abuse, mental illness, witnessing violence, and incarceration, the greater their risk of both infectious and non-communicable diseases. Subsequent work has replicated these findings at all levels of income (Ramiro et al. 2010; Bellis et al. 2014), and it is now widely accepted that that psychosocial stress during childhood, and adolescence has long-term detrimental effects on adult health.

Multiple mechanisms have been proposed to explain how adverse childhood events might impact health decades later. Behaviorally, childhood adversity may indirectly affect adult health through the practice of negative health behaviors such as smoking, excess alcohol consumption, inactivity, and sexual promiscuity (Campbell et al. 2016). From a biological perspective, it has been shown that chronic activation of the stress response systems can cause "wear and tear" on the body and compromise long-term health (Taylor 2010). Stress occurring early in life may be particularly important because the developing systems themselves, including brain structure and function, may be adversely affected (De Bellis and Zisk 2014). Other pathways shown to mediate the association between childhood adversity and adult health include increased exposure to stress, impaired interpersonal relationships and psychosocial resources, psychological distress, and low socioeconomic status (Nurius et al. 2018; Umberson et al. 2014).

Theoretical Perspective: The Life-Span Approach

According to life-span developmental psychologists (Baltes 1987), development involves a system of demands and opportunities that people confront as they traverse the life span. Changes may occur for any individual at different times, in different directions, and any order. In regard to adversity, early exposure can alter the developmental trajectory for the worse, with additional exposures having a graded effect. This trajectory can involve any of the mechanisms identified previously, such as impaired personal relationships, risky health behavior, altered stress responses, or reduced psychosocial resources. Yet the life-span perspective also notes that behavior and biological processes are plastic; that is, they are susceptible to change at any point in life. Contextual influences that are unique to each individual play a role in regulating the nature of this change.

Religiosity as a Moderator

This study focuses on religiosity as a context for understanding some of the individual differences in the long-term effects of adverse childhood events on adult health. Religion has salutary associations with a wide range of physical health outcomes including heart disease, cerebrovascular disease, dementia, immune function, endocrine function, cancer, and mortality (Koenig et al. 2001). These associations have been demonstrated in male and female participants of all ages coming from many global regions, different ethnic groups, and a variety of religions. In their comprehensive review of religion and health, Koenig et al. conclude that "risk factor profiles of those who are more religious/spiritual (R/S) are more favorable, and the actual research that directly examines relationships between R/S and physical health, on average, reports better physical health and greater longevity" (p. 586).

In addition to the direct associations between religion and health, and perhaps more important for the present study, religion is believed to transmit its beneficial effects via the same factors thought to mediate the pathway from childhood adversity to adult health. For example, childhood adversity predicts greater relationship strain and reduced relationship support in adulthood (Umberson et al. 2014). Social connections, in turn, have been shown to positively influence physical health (Uchino et al. 2018). Yet religious involvement is consistently related to greater social support, and prospective studies have found that religious involvement predicts increased social support over time (Strawbridge et al. 2001). Hence, it is possible that religious involvement in adulthood may provide a source of social support that could mitigate the long-reaching effects of early life hardship.

Another mediating factor between childhood adversity and adult health is high-risk behavior. Accumulating evidence indicates that childhood adversity is associated with elevated risk of smoking, alcohol problems, and illicit drug use (Campbell et al. 2016), all of which are known risk factors for poor health. However, the preponderance of studies of religion and risk behavior, including multiple prospective studies, have documented inverse relationships between religious involvement and smoking, alcohol use and abuse, and other illicit substance use (Strawbridge et al. 2001; Koenig et al. 2001). Again, religious involvement in adulthood may create a context in which people who experienced early adversity are steered away from high-risk health behavior. Similar arguments could be made for other mediators situated in the pathway from early adversity to adult health, including adult stress exposure and psychosocial resources.

Despite the potential that religious involvement may offer for moderating the long-term effects of childhood adversity on health, minimal research has explored this issue. A few studies have examined the moderating role of religion in relation to mental health outcomes, and these have generally reported favorable results. For example, positive religious coping was associated with lower psychological distress (including anger, depressive symptoms, and suicidality) among adult survivors of abuse (Dervic et al. 2006; Gall 2006). Religious salience buffered the

effects of childhood abuse on positive affect over time (Jung 2018), and intrinsic religiosity, positive religious coping, forgiveness, and gratitude were shown to protect against mental health difficulties among adult survivors of childhood maltreatment. However, these religiosity dimensions had no effect on physical health outcomes (Reinert et al. 2015). To our knowledge, no other studies have explored the intersecting effects of early adversity and religion on physical health. Yet such research would advance our understanding of how contextual factors might alter the health trajectories of at-risk individuals and suggest potential sources of resilience.

Dimensions of Religiosity and the Present Study

Religion is a multi-faceted construct that includes beliefs, commitment, outward behavior, private practices, social connections, and more. In general, each of these components is intended to facilitate closeness with the transcendent and to help people relate to each other as fellow members of a faith community. The various dimensions of religiosity are conceptually distinct from each other; they are also distinct from other psychological or social constructs. The most common measures of religiosity in the religion/health literature are simple indicators of involvement such as service attendance or single-item ratings of religiousness; however, given the multidimensionality of religion, it is important to consider other aspects of one's religious experience. Consistent with this premise, the present study explored four measures of religiosity that captured four distinct dimensions: religious identification (that is, how important one's religion was to him or her), outward behavior (service attendance), private practice (such as praying or reading religious material), and religious support from others in the faith community.

The purpose of the present study was to test the moderating effect of four dimensions of religiosity on the relationship between adverse childhood events and adult physical health. Based on recommendations to treat physical health as a multidimensional construct (Patrick and Erickson 1993), we employed three different measures of adult health, including self-rated health, functional limitations, and dyspnea (shortness of breath). We hypothesized the following:

1. Adverse childhood experiences will be associated with poorer self-rated health, increased functional limitations, and increased symptoms of dyspnea.
2. Religious commitment, service attendance, private religious practice, and religious support will buffer the detrimental effects of adverse childhood experiences.

Method

Sample

Data for this study were drawn from the Midlife in the United States study (MIDUS; Brim et al. 2004), a national sample of 7108 English-speaking, non-institutionalized

adults, ages 25 to 74 when they were first assessed in 1995–1996. Two additional waves of data collection were conducted approximately 9 and 18 years later with approximately 70% of respondents participating at each subsequent wave. This study used data from the second wave (MIDUS 2) because two of the religiosity composite scales were first introduced at that wave. MIDUS is a publicly available data set, and this study was deemed exempt from institutional review.

Our sample consisted of 4041 participants who completed both the telephone interview and self-administered questionnaire at MIDUS 2. Of those participants, 55.4% identified as female and 44.6% identified as male. Educational background was as follows: 6.1% had less than a high school degree, 27.0% had a high school degree, 28.7% had some college but less than a four-year degree, 19.4% had a four-year degree, and 18.8% had at least some graduate school. Regarding race, 91.5% of the sample identified as White, 3.7% as African American, 1.5% as Native American, 0.5% as Asian, and 2.8% of the sample identified as other, or indicated that they didn't know, or declined to answer.

Measures

Physical Health

We used three measures of physical health: self-reported physical health, functional limitations, and dyspnea (shortness of breath). Self-reported physical health was assessed by the following item: "Using a scale from 0 to 10 where 0 means 'the worst possible health' and 10 means 'the best possible health,' how would you rate your health these days?". Scores ranged from 0 to 10, with higher scores indicating better health. Self-rated health is one of the most frequently used indices of health, and it has been consistently linked to a range of objective health outcomes across socioeconomic groups (Benyamini 2011). The 11-point scale used here has been linked with mortality in the MIDUS data (Ferraro and Wilkinson 2015).

Functional limitations were assessed by asking participants to indicate on a four-point scale (1 = *a lot*, 4 = *not at all*) the extent to which their health limited their basic activities of daily living. Specifically, participants were asked to note their limitations for the following tasks: bathing or dressing; climbing one flight of stairs; and walking one block. Scores were reverse-coded and averaged across each of the three items. However, the distribution of responses was zero-inflated (70% of respondents reported no limitations), and remaining responses were severely non-normal. For this reason, we collapsed all affirmative responses and treated functional limitations as a dichotomous variable (0 = *no limitations*, 1 = *some limitations*). The inability to carry out basic activities of daily living has been shown to predict a variety of negative health outcomes, including mortality (Weiner et al. 1990).

Dyspnea was assessed by asking participants, "Do you get short of breath in the following situations: hurrying on ground level or walking up a slight hill, walking with other people your age on level ground, walking at your own pace on level ground, or washing or dressing?" The frequency distribution for this variable was highly skewed and zero-inflated, with 65.2% of respondents reporting no dyspnea,

24.3% reporting one problem, and only 10.5% of the sample reporting more than one problem. Therefore, we collapsed all affirmative responses, and this variable was coded dichotomously (0 = *no dyspnea*; 1 = *dyspnea*). Shortness of breath is often a marker of a serious health problem, most likely involving the heart or lungs. In addition, it is thought to be the single most important symptom that influences an individual's functioning on a day-to-day basis (Mahler and Wells 1988).

Adverse Childhood Experiences (ACE)

We used the measure of adverse child experiences developed by Danielson and Sanders (2018) based on existing questions in the MIDUS data. The measure is the sum of dichotomized "yes" responses across eight forms of adversity occurring before age 18: did not live with both biological parents up until age 16, lived with someone with substance abuse problems, family experienced financial distress, family moved frequently, experienced sexual assault, emotional abuse, physical abuse, or neglect. Scores range from 0 to 8 with higher scores indicating exposure to more forms of adversity. Factor analysis of this measure revealed two factors consistent with the standard ACE study: household dysfunction and abuse/neglect (Felitti et al. 1998). Convergent validity was demonstrated via significant correlations with chronic conditions in late life and life satisfaction (inverse).

Religiosity

We used four measures of religiosity: religious identification, private religious practice, service attendance, and religious support. Religious identification was assessed with the following seven items: How religious are you?" "How important is religion in your life?" "How important is it for you—or would it be if you had children now—to send your children for religious or spiritual services or instruction?" "How closely do you identify with being a member of your religious group?" "How much do you prefer to be with other people who are the same religion as you?" "How important do you think it is for people of your religion to marry other people who are the same religion?" "How important is it for you to celebrate or practice on religious holidays with your family, friends, or members of your religious community?" Respondents used a scale ranging from 1 (*very*) to 4 (*not at all*); responses were reversed and summed to create an index of religious commitment with higher scores indicating greater commitment. McDonald's omega (McDonald 1999) for this measure was $\omega = 0.90$.

Private religious practice was assessed by asking respondents how often they: "pray in private;" "meditate or chant;" "read the Bible or other religious literature." Responses ranged from 1 (*once a day or more*) to 6 (*never*). Responses were reversed and summed; higher scores indicate more frequent private religious practice.

Participants were asked to report how frequently they attend religious or spiritual services using a scale ranging from 1 (*once a day or more*) to 6 (*never*). Scores were reversed to a scale ranging from 0 (*never*) to 5 (*once a day or more*) with higher rankings reflecting more frequent attendance.

Religious support was measured with the following four items from the Fetzer Multidimensional Measure of Religiosity for Health Research (Fetzer 1999): "If you were ill, how much would people in your congregation help you out;" "If you had a problem or were faced with a difficult situation, how much comfort would people in your congregation be willing to give you;" "How often do people in your congregation or spiritual community make too many demands on you;" "How often do people in your congregation or spiritual community criticize you and the things you do". Participants indicated quantity of support using a scale ranging from 1 (*a great deal*) to 4 (*none*). These items were specifically designed to tap anticipated support, which may have a more beneficial effect on health than actual assistance received, and negative interactions, which may have a more detrimental effect on health than the benefits of pleasant interactions. Scores were reversed where necessary and added such that higher rankings reflected greater support. Omega for this measure was $\omega = 0.76$.

For each of the composite religiosity scales, a score was computed if there was a valid response for at least half the items comprising the scale. Missing values were imputed using the mean value of the completed items. Item-level missingness was less than 1% for each of the composite religiosity scales.

Control Variables

Demographic variables included age (continuous), sex (0 = *male*, 1 = *female*), education (0 = *high school or less*, 1 = *some college or more*), and race (coded 0 = *white*, 1 = *other* because of the small number of minorities in the sample).

Two additional control variables were included. Friend support was assessed with the following four items: "How much do your friends really care about you;" "How much do they understand the way you feel about things;" "How much can you rely on them for help if you have a serious problem;" "How much can you open up to them if you need to talk about your worries" (adapted from Schuster et al. 1990). Responses ranged from 1 (*a lot*) to 4 (*not at all*); items were reverse scored and added so that higher scores reflect greater support. Omega for this measure was $\omega = 0.88$. Finally, optimism was assessed with the following three items which were rated on a scale from 1 (*agree a lot*) to 5 (*disagree a lot*): "In uncertain times, I usually expect the best;" "I'm always optimistic about my future;" "I expect more good things to happen to me than bad" (Scheier and Carver 1985). Items were reverse scored and summed so that higher scores indicate greater optimism. Omega was $\omega = 0.70$.

Analytic Approach

First, we examined descriptive statistics and bivariate correlations among all study variables. To determine whether religiosity moderated the effects of adverse childhood experiences on adult self-rated health, we used ordinary least squares hierarchical regression. Functional limitations and dyspnea were dichotomous, and we used logistic regression for analyses involving these variables. Five separate models

were estimated for each of the three dependent variables. The first model was a baseline model which included control variables that have been shown to correlate with health (age, gender, education, race) and adverse childhood experiences. Subsequent models added one of the four religiosity variables (religious identification, private religious practice, service attendance, or religious support) and the associated interaction term that allowed the effect of ACE to vary as a function of religiosity. Specifically, we entered a two-way interaction term consisting of the total ACE score multiplied by one of the religiosity variables. In follow-up analyses for significant interactions, we tested the simple effects of the total ACE score at three levels of the religiosity variable. Finally, many participants ($n = 1512$) chose the option *does not apply* in response to the four religious support questions, resulting in a substantially smaller sample size for analyses involving this variable. For this reason, we conducted sensitivity analyses in which only the participants who had valid data for religious support were included in the analyses involving religious identification, private religious practice, and service attendance.

Results

Means, standard deviations, and percentages for the key variables are presented in Table 1. More than half the sample experienced at least one adverse childhood event. Correlations among variables are presented in Table 2. Higher total childhood adversity was associated with poorer self-rated health and an increased tendency to experience functional limitations and shortness of breath. Consistent with substantial previous research, there were significant associations between the religiosity dimensions and the health variables. Service attendance and religious support were significantly positively correlated with self-rated health. Religious identification and private religious practice showed significant positive correlations with functional limitations and shortness of breath.

Table 1 Characteristics of the sample

Variable			%
At least one ACE			64.0
Some functional limitations			30.0
Dyspnea			34.8
	Mean	SD	Range
Age	56.23	12.39	30–84
Religious commitment	19.64	5.57	7–28
Private religious practice	9.73	4.25	3–18
Service attendance	1.91	1.47	0–5
Religious support	13.97	1.75	4–16
Self-rated health	7.37	1.60	0–10

Table 2 Intercorrelations among major study variables

	1	2	3	4	5	6	7	8	9	10	11
1. Total ACE	–										
2. Age	−.08***	–									
3. Gender	.07***	−.02	–								
4. Education	−.07***	−.14***	−.08***	–							
5. Nonwhite	.06***	−.04***	.02	−.02	–						
6. Religious identification	−.09***	.15***	.16***	−.06***	.07***	–					
7. Private religious practice	−.00	.17***	.19***	−.04*	.11***	.67***	–				
8. Service attendance	−.12***	.15***	.10***	.01	.04*	.74***	.66***	–			
9. Religious support	−.06**	.10***	.10***	−.05*	−.02	.36***	.30***	.34***	–		
10. Self-rated health	−.13***	−.06***	.01	.13***	−.02	.01	−.01	.07***	.08***	–	
11. Functional limitations	.08***	.26***	.12***	−.20***	.04*	.10***	.10***	.01	−.01	−.41***	–
12. Dyspnea	.12***	.19***	.10***	−.17***	.04**	.05***	.06***	.01	−.04	−.34***	.41***

*$p < .05$, **$p < .01$, ***$p < .001$

Table 3 Unstandardized regression coefficients and confidence intervals from linear regression models predicting self-rated physical health

Variable	Model 1 $N=3999$	Model 2 $N=3960$	Model 3 $N=3949$	Model 4 $N=3948$	Model 5 $N=2383$
Control variables					
Age					
B	−0.007***	−0.007***	−0.007***	−0.008***	−0.007***
95% CI	[−0.01, −0.003]	[−0.01, −0.003]	[−0.01, −0.003]	[−0.01, −0.004]	[−0.01, −0.00]
Gender					
B	0.08	0.08	0.08	0.06	0.01
95% CI	[−0.02, 0.17]	[−0.02, 0.18]	[−0.03, 0.18]	[−0.04, 0.15]	[−0.12, 0.13]
Education					
B	0.38***	0.37***	0.37***	0.36***	0.39***
95% CI	[0.28, 0.49]	[0.26, 0.48]	[0.27, 0.48]	[0.25, 0.47]	[0.25, 0.53]
Race					
B	−0.05	−0.05	−0.05	−0.07	−0.04
95% CI	[−0.23, 0.13]	[−0.23, 0.13]	[−0.23, 0.13]	[−0.24, 0.12]	[−0.26, 0.18]
Main effects					
ACE total					
B	−0.14***	−0.13*	−0.12**	−0.11*	−0.57**
95% CI	[−0.18, −0.11]	[−0.25, −0.02]	[−0.21, −0.04]	[−0.20, −0.10]	[−0.92, −0.22]
Religious commitment					
B	–	0.003	–	–	–
95% CI		[−0.01, 0.01]			
Religious practice				–	–
B	–	–	0.005		
95% CI			[−0.01, 0.02]		
Service attendance					
B	–	–	–	0.05*	–
95% CI				[0.01, 0.10]	

Table 3 (continued)

Variable	Model 1 $N=3999$	Model 2 $N=3960$	Model 3 $N=3949$	Model 4 $N=3948$	Model 5 $N=2383$
Religious support					
B	–	–	–	–	0.04
95% CI					[−0.01, 0.01]
Interaction effects					
ACE × Religion variable					
B	–	−0.001	−0.002	−0.007	0.03*
95% CI		[−0.01, 0.01]	[−0.01, 0.01]	[−0.02, 0.03]	[0.01, 0.06]
R^2 for complete model	.035	.035	.035	.037	.047

*$p<.05$, **$p<.01$, ***$p<.001$

Ordinary least squares regression was used to evaluate the relationships among childhood adversity, the four religiosity dimensions, and self-rated health. Results are summarized in Table 3. Model 1 was the baseline model; it included demographic covariates and total adverse childhood events. As expected, increased childhood adversity was associated with poorer self-rated health in midlife, controlling for age, gender, education, and race. Model 2 added religious identification and its interaction with childhood adversity; neither of these terms were significant when entered simultaneously. Model 3 added private religious practice and its interaction with childhood adversity to the baseline model. Neither of these terms were significant. Model 4 added service attendance and its interaction with childhood adversity to the baseline model. Although service attendance was significantly associated with better self-rated health, its interaction with childhood adversity was not significant. Finally, Model 5 added religious support and its interaction to the baseline model. The interaction between religious support and self-rated health was significant. This interaction was probed by plotting the effect of childhood adversity on self-rated health at three levels of religious support (one standard deviation below the mean, the mean, and one standard deviation above the mean). These simple slopes are shown in Fig. 1. At low levels of religious support, the regression coefficient for total adverse childhood events was $B = -0.19$, $p < 0.001$. However, at high levels of religious support, the coefficient was $B = -0.08$, $p < 0.05$, indicating a weaker effect of early adversity on physical health in adulthood. To ascertain that religious support was not a proxy for an overall positive outlook or social support in general, optimism and support from friends were added to Model 5. The interaction between religious support and childhood adversity remained significant, $B = -0.03$, $p = 0.02$.

Logistic regression was used to evaluate the relationships among childhood adversity, religiosity dimensions, and functional limitations, and results are summarized

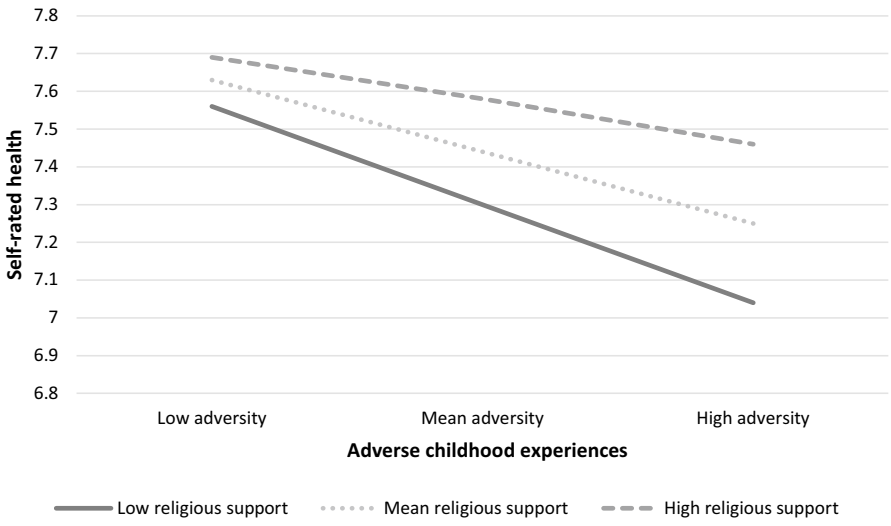

Fig. 1 Self-rated health as a function of childhood adversity and religious support. The three levels of religious support are the mean and one standard deviation above and below the mean

Table 4 Odds ratios and 95% confidence intervals from logistic regression models predicting functional limitations

Variable	Model 1 $N=3997$	Model 2 $N=3957$	Model 3 $N=3946$	Model 4 $N=3946$	Model 5 $N=2384$
Control variables					
Age					
OR	1.05***	1.05***	1.05***	1.05***	1.06***
95% CI	[1.04, 1.06]	[1.04, 1.06]	[1.04, 1.06]	[1.04, 1.06]	[1.05, 1.06]
Gender					
OR	1.69***	1.68***	1.67***	1.74***	1.91***
95% CI	[1.46, 1.96]	[1.44, 1.95]	[1.44, 1.95]	[1.50, 2.03]	[1.57, 2.34]
Education					
OR	0.50***	0.50***	0.50***	0.50***	0.56***
95% CI	[0.43, 0.58]	[0.43, 0.58]	[0.43, 0.58]	[0.43, 0.58]	[0.46, 0.68]
Race					
OR	1.40**	1.40*	1.37*	1.44**	1.85***
95% CI	[1.09, 1.81]	[1.08, 1.81]	[1.06, 1.78]	[1.12, 1.87]	[1.84, 2.55]
Main effects					
ACE total					
OR	1.15***	1.14	1.14*	1.11**	2.04**
95% CI	[1.09, 1.21]	[0.95, 1.36]	[1.00, 1.29]	[1.05, 1.42]	[1.21, 3.44]
Religious commitment					
OR	–	1.01	–	–	–
95% CI		[0.99, 1.02]			
Religious practice					
OR	–	–	1.01	–	–
95% CI			[0.99, 1.04]		
Service attendance					
OR	–	–	–	0.92*	–
95% CI				[0.86, 0.98]	

Table 4 (continued)

Variable	Model 1 $N=3997$	Model 2 $N=3957$	Model 3 $N=3946$	Model 4 $N=3946$	Model 5 $N=2384$
Religious support					
OR	–	–	–	–	0.99
95% CI					[0.92, 1.06]
Interaction effects					
ACE × religion variable					
OR	–	1.00	1.00	1.02	0.96*
95% CI		[0.99, 1.01]	[0.99, 1.01]	[0.98, 1.02]	[0.93, 0.99]
Model fit statistics					
Pseudo R^2	.16	.16	.16	.16	.19

*$p<.05$, **$p<.01$, ***$p<.001$

in Table 4. Model 1 was the baseline model, and it included demographic covariates and total adverse childhood events. As expected, greater childhood adversity was associated with greater odds of functional limitations in midlife. Model 2 added religious identification and its interaction with childhood adversity; neither of these odds ratios were significant when entered simultaneously. Model 3 added private religious practice and its interaction with adversity to the baseline model; neither of these terms significantly predicted functional limitations. Model 4 built upon the baseline model by including service attendance, which was significantly associated with lower odds of functional limitations. However, service attendance did not interact with childhood adversity. Finally, Model 5 introduced religious support and its interaction to the baseline model. There was a significant interaction between religious support and childhood adversity such that greater support was associated with lower odds of functional limitations. We probed this interaction by plotting the effect of childhood adversity on predicted probability of functional limitations at three levels of religious support (specifically, we used the mean and one standard deviation above and below the mean). These slopes are presented in Fig. 2. At low levels of religious support, childhood adversity was associated with increased odds of functional limitations, $OR = 1.26$, $p < 0.001$. However, at high levels of religious support, the odds ratio was only marginally significant, $OR = 1.10$, $p = 0.06$. Finally, to rule out a positive outlook or general social support as explanatory variables, optimism, and support from friends were added to Model 5. The interaction between religious support and childhood adversity remained significant, $OR = 0.96$, $p = 0.03$.

Table 5 presents the results of logistic regression models predicting shortness of breath in midlife from childhood adversity, religiosity dimensions, and their interactions. The baseline model (Model 1) showed that childhood adversity was

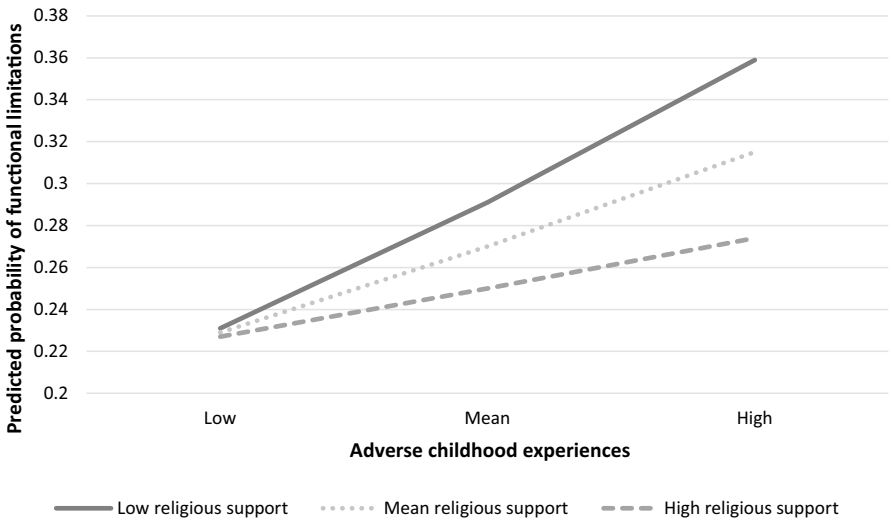

Fig. 2 Predicted probability of functional limitations as a function of childhood adversity and religious support. The three levels of religious support are the mean and one standard deviation above and below the mean

Table 5 Odds ratios and 95% confidence intervals from logistic regression models predicting shortness of breath

Variable	Model 1 $N=4018$	Model 2 $N=3977$	Model 3 $N=3966$	Model 4 $N=3964$	Model 5 $N=2394$
Control variables					
Age					
OR	1.03***	1.03***	1.03***	1.03***	1.04***
CI	[1.03, 1.04]	[1.03, 1.04]	[1.03, 1.04]	[1.03, 1.04]	[1.03, 1.04]
Gender					
OR	1.46***	1.45***	1.46***	1.49***	1.59***
CI	[1.27, 1.68]	[1.26, 1.67]	[1.27, 1.68]	[1.30, 1.72]	[1.32, 1.91]
Education					
OR	0.57***	0.57***	0.57***	0.57***	0.61***
CI	[0.49, 0.66]	[0.49, 0.66]	[0.49, 0.66]	[0.49, 0.66]	[0.50, 0.73]
Race					
OR	1.38*	1.33*	1.33*	1.35*	1.46*
CI	[1.08, 1.75]	[1.04, 1.69]	[1.08, 1.75]	[1.06, 1.73]	[1.08, 1.98]
Main effects					
ACE total					
OR	1.91***	1.20*	1.23***	1.12***	1.91*
CI	[1.14, 1.25]	[1.02, 1.42]	[1.10, 1.38]	[1.11, 1.29]	[1.16, 3.16]
Religious commitment					
OR	–	1.01	–	–	–
CI		[0.99, 1.02]			
Religious practice					
OR	–	–	1.01	–	–
CI			[0.99, 1.04]		
Service attendance					
OR	–	–	–	0.95	–
CI				[0.89, 1.02]	

Table 5 (continued)

Variable	Model 1 $N=4018$	Model 2 $N=3977$	Model 3 $N=3966$	Model 4 $N=3964$	Model 5 $N=2394$
Religious support					
OR	–	–	–	–	0.96
CI					[0.90, 1.03]
Interaction effects					
ACE × religion variable					
OR	–	1.00	1.00	0.99	0.97 †
CI		[0.99, 1.02]	[0.99, 1.01]	[0.96, 1.02]	[0.93, 0.99]
Model fit					
Pseudo R^2	.11	.11	.11	.11	.12

† $p<.10$, * $p<.05$, ** $p<.01$, *** $p<.001$

associated with increased odds of dyspnea in midlife, controlling for age, gender, education, and race. The remaining models introduced each religiosity dimension and their associated interactions with adversity. The interaction term involving religious support was marginally significant ($p = 0.06$), indicating that higher levels of religious support mitigated the effects of childhood adversity on dyspnea. We probed this interaction by plotting the effect of childhood adversity on predicted probability of dyspnea at low, mean, and high levels of religious support. Simple slopes depicting these predicted probabilities are presented in Fig. 3. At low levels of religious support, childhood adversity was associated with increased odds of dyspnea, $OR = 1.26$, $p < 0.001$. However, at high levels of religious support, childhood adversity had less of an effect, $OR = 1.12$, $p < 0.05$. When controlling for optimism and friend support, the interaction between religious support and childhood adversity remained marginally significant, $OR = 0.97$, $p = 0.09$.

Finally, about 37% of participants did not respond to the questions about religious support, instead endorsing "does not apply to me". Therefore, as a sensitivity analysis, we repeated all regression analyses using only those participants who had valid data for religious support ($n = 2394$). One difference emerged from the sensitivity analysis. The logistic regression analysis involving religious identification as a predictor of functional limitations revealed a marginally significant interaction between childhood adversity and religious identification, $OR = 0.98$, $p = 0.05$, 95% CI = [0.97, 1.00]. This interaction indicated that the effect of childhood adversity on functional limitations was weaker for those who identified more strongly with their religion.

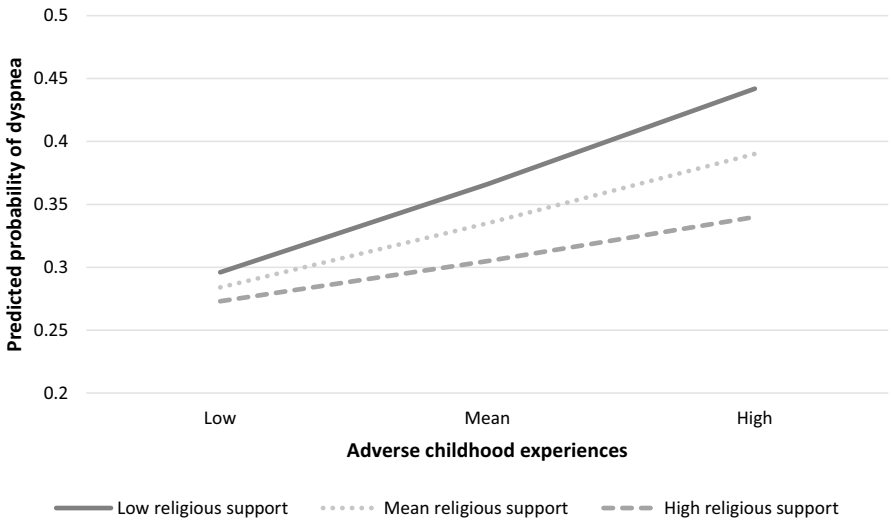

Fig. 3 Predicted probability of dyspnea as a function of childhood adversity and religious support. The three levels of religious support are the mean and one standard deviation above and below the mean

Discussion

This study explored the moderating effect of four dimensions of religiosity on the relationship between childhood adversity and physical health in midlife. Consistent with substantial previous evidence, adverse childhood experiences were related to poorer health in adulthood, including poorer self-rated health and increased likelihood of functional limitations or shortness of breath. Religious support from congregations or spiritual communities consistently moderated these relationships, but religious identification, private religious practices, and service attendance did not.

The benefits of social support for physical and mental health have been well-documented (Cohen 2004; Uchino et al. 2018). Although fewer studies have explored the benefits of religious support, they have generally shown that people who report strong support from others in their faith community also report better emotional functioning (Lazar and Bjorck 2008; Yi and Bjorck 2014), better perceived health (Lazar and Bjorck 2008), and are buffered against the noxious effects of stress on self-rated health and mortality (Krause 2006a, b). Indeed, religious support may provide a particularly potent source of support for two reasons (Ellison and Levin 1998). First, members of a religious community tend to share common belief and value systems, and this shared foundation facilitates the formation of friendships. Second, most religious traditions teach the value of loving and helping others. Thus, adults with a history of adversity may encounter attitudes of acceptance, support, and compassion from others in their faith community. This source of support may be particularly valuable for people who grew up in harsh environments that did not model or nurture the development of skills for building meaningful relationships (Browne and Finkelhor 1986). Further, religious support can take a variety of forms. For example, churches or other faith communities may offer tangible assistance such as financial aid, meals, health screening, or educational programs. Many religious organizations offer social or educational programs specifically for older adults, and these programs provide ripe opportunities for giving and receiving socioemotional support. Finally, many churches encourage participation in small groups in which members share burdens and pray for each other.

It is important to note that religious support was evaluated in mid to late life, decades after the original adverse experiences ended. The sequelae of early adversity that mediate its effect with health (such as lower educational attainment, risky behavior, mental health problems, or interpersonal difficulties) unfold across adulthood and can have a cumulative negative impact. Our finding that religious support can mitigate the negative health impacts of these factors underlines the importance of considering the context of development. Changes in context (in this case, relationships with others in a faith community) can redirect trajectories of development at any point, even at later stages in life. This finding also highlights the fact that childhood adversity does not deterministically lead to poor physical health in mid to late life. The life-span perspective posits continuity, not immutability, and there is potential for change (for better or for worse) at any point.

An important implication of this study is that religious support could be incorporated in interventions intended to lessen the long-term consequences of adverse

childhood experiences. However, some evidence suggests that people who experienced early adversity or trauma are less likely to be religiously involved (Chen and Koenig 2006). Indeed, our results showed significant negative bivariate correlations between exposure to childhood adversity and religious identification, service attendance, and religious support. Thus, individuals with a history of adversity may be reluctant to initiate engagement with religion, and any intervention must be sensitive to their wishes. However, those whose religious beliefs are important to them should be encouraged to seek out and participate in a community of faith.

Limitations

While our findings are thought provoking, some limitations should be noted. First, it is possible that the wording of the religious support questions influenced our results. Two of the religious support questions asked about anticipated support based on hypothetical stressful situations ("If you were ill, how much would people in your congregation help you out;" "If you had a problem or were faced with a difficult situation, how much comfort would people in your congregation be willing to give you?"), whereas the other religiosity variables did not pose hypothetical situations. Although the items were intentionally written to tap anticipated support rather than actual assistance received, it is possible that these situations held particular salience for individuals with a history of adversity. Importantly, we note that religious support moderated the link between early adversity and health even when controlling for optimism and support from friends. Second, effect sizes for the interaction between early adversity and religious support were small. Because findings were consistent across three unique aspects of physical health, we have confidence in these results; nevertheless, there is substantial individual variability in health outcomes and clearly, many other factors play a role. Third, we relied upon retrospective reports of childhood adversity which are subject to the fallibility of memory. However, a review of the available evidence suggested that the bias associated with such reports is not sufficiently great to invalidate their use (Hardt and Rutter 2004). Finally, our study design was cross-sectional. We have interpreted our results to mean that religious support in midlife buffers the long reach of early adversity on health, but it is possible that people who are generally more resilient to early adversity are also more likely to seek and establish religious support.

Nevertheless, this study makes an important contribution to the literature exploring factors that can "turn off" the long-term noxious effects of adversity on physical health. It illustrates that environmental contexts formed decades after adverse events occurred can mitigate the lingering effects of those events. It also suggests important directions for future research. For example, this study examined four distinct dimensions of religiousness, but there are many other aspects of religion and related constructs that should be explored including religious coping, intrinsic religiosity, forgiveness, and gratitude. Future research should also investigate the buffering effect of religious involvement on other ostensible pathways connecting early adversity and adult health such as risk behavior or increased stress.

Conclusion

Adverse childhood experiences can set in motion a series of negative events that ultimately take a toll on adult health. This study suggests that religious involvement, particularly religious support, may help to cushion those effects. The religious admonishment to "love one another" has the potential to redeem the long reach of childhood misfortune.

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Data Availability The MIDUS data are publicly available through the Inter-university Consortium for Political and Social Research.

Declarations

Conflict of interest The authors have no relevant financial or non-financial interests to disclose.

Ethical Approval This study involved secondary analysis of a publicly available dataset and was deemed exempt from review by the Institutional Review Board at Grove City College.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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